

CLAIMS

1. An inertial sensor with failure threshold, comprising:
a first body and a second body, which are moveable relative to one another and are constrained by a plurality of elastic elements; and
at least a first sample element connected between said first body and said second body and shaped so as to be subjected to a stress when said second body is outside of a relative resting position with respect to said first body, and having a weakened region.
2. The sensor according to claim 1, wherein said weakened region comprises a narrowing of said first sample element.
3. The sensor according to claim 1 wherein said weakened region is defined by notches made on said first sample element.
4. The sensor according to claim 3 wherein said weakened region is defined by pairs of opposite lateral notches.
5. The sensor according to claim 1 wherein said weakened region comprises a groove extending transversely between opposite edges of said first sample element.
6. The sensor according to claim 1 wherein said first sample element is set in a gap between said first body and said second body.
7. The sensor according to claim 1, further comprising at least a second sample element connected between said first and second bodies.

8. The sensor according to claim 7 wherein each of said first and second sample elements comprises at least one respective weakened region.

9. The sensor according to claim 7 wherein said first and second sample elements extend laterally from said second body in opposite directions.

10. The sensor according to claim 7 wherein said first and second sample elements are substantially T-shaped.

11. The sensor according to claim 10 wherein said first and second sample elements comprise respective first portions aligned and facing one another, and respective second portions, which are substantially perpendicular to said first portions and parallel to one another.

12. The sensor according to claim 11 wherein each of said first and second sample elements comprises at least two weakened regions defined by narrowing of said first portions and of said second portions, respectively.

13. The sensor according to claim 11 wherein ends of said first portions are connected to said second body and opposite ends of said second portions are fixed to said first body.

14. The sensor according to claim 7 wherein said first and second sample elements are L-shaped.

15. The sensor according to claim 14 wherein said weakened regions are made at respective vertices of said first and second sample elements.

16. The sensor according to claim 1 wherein said first sample element has a substantially rectilinear shape.

17. The sensor according to claim 1 wherein said first sample element has, at one of its ends, at least one anchoring pad fixed to said first body by means of a bonding element.

18. The sensor according to claim 1 wherein said first body and said second body and said first sample element are conductive.

19. A device, comprising:
a semiconductor material substrate;
a sample element having a first end coupled to the substrate, the sample element configured to break under a preselected strain; and
a semiconductor material body coupled to a second end of the sample element.

20. The device of claim 19 wherein the sample element has a T shape, the first end forming a cross-bar portion of the T and being coupled to the substrate at extreme ends of the crossbar, the second end extending from a central portion of the crossbar to form the T.

21. The device of claim 19, further comprising an additional sample element having a first end coupled to the substrate, a second end coupled to the semiconductor material body, and configured to break under the preselected strain.

22. The device of claim 19, further comprising a weakened region on the sample element, and wherein the sample element is configured to break at the weakened region under the preselected strain.

23. The method of claim 19 wherein the weakened region comprises a narrowed region of the sample element.

24. The device of claim 16 wherein the device is a cell phone.

25. A cellular telephone, comprising:
an inertial sensor configured to permanently change conductive property of a conductive path in response to a preselected acceleration; and
a circuit configured to detect a change in the conductive properties of the conductive path.

26. The cellular telephone of claim 25 wherein the inertial sensor comprises a sample element configured to break in response to the preselected acceleration, and wherein the conductive path passes through the sample element.

27. The cellular telephone of claim 26 wherein the sample element is formed of semiconductor material and has a first end coupled to a semiconductor substrate and a second end coupled to a semiconductor material body, the semiconductor body coupled to the semiconductor substrate via spring elements such that the body is free to move relative to the substrate in response to acceleration of the cellular telephone.

28. The cellular telephone of claim 25 wherein the preselected acceleration is selected to be less than or equal to an acceleration sufficient to damage the cellular telephone.